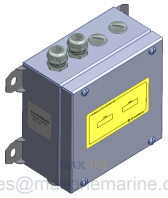
CS-IC22 SS WP Safety Input/Output Module

Product reference	
Part No.	5210067-00A
Manufacturer	Consilium / Salwico
Model	CS-IC22 SS WP



sales@maxonemarine.com

Product overview

The CS-IC22 SS WP is an input and output unit for various integration of safety inputs/ outputs. It has been designed for use in harsh and corrosive environments and to comply with the standards for the industrial, maritime, offshore and rolling stock markets up to Safety Integrity Level 2 (SIL 2). The CS-IC22 SS WP has two inputs that can be connected to external equipment with a dry relay contact. The CS-IC22 WP supervises the cable to the external equipment for cable break and short circuit, and the inputs can be configured as active high or active low. The function of the inputs can be configured to be: a general input; a fault; an alarm from a manual call point; an alarm from a smoke sensor; an alarm from a heat sensor; an alarm from a flame sensor; an alive signal (output); The CS-IC22 SS WP can control and monitor external devices, such as fire doors, fire dampers, sprinklers, hatches etc. The outputs on the CS-IC22 SS WP can be configured to be activated when there is a fire, fault, disablement or input condition locally on the loop-line. Features: Two configurable I/O – they can either be ‘remote indication’ outputs, alive signals or dry contact inputs. Handling of short circuits and cable breaks on the loop-line. Stainless steel enclosure IP66. Local intelligence via an integrated CPU The integrated CPU makes it possible to make decisions locally, like evaluation of the alarm condition. IDAxt protocol The IDAxt protocol meets the demands on data integrity, reliability and robustness required for use in SIL 1 and SIL 2 safety functions and safety systems. The Periodic Built-In Self-Test is a central mechanism which the system uses to ensure long proof test intervals. Countermeasures (defences) have been implemented in order to address the fault modes (threats) in the fire detection system. These countermeasures are done in order to increase the confidence in the system. The system has two types of Built-In Self-Tests (BIST). The first BIST is made continuously; for instance when reading A/D values from hardware. This typically involves evaluation of the read value to determine if the hardware is broken; i.e. gives measurements outside an acceptable interval. The second BIST is the Periodic Built-In Self- Test (Periodic BIST) which is made once every five minutes in order to verify the safety function by testing communication paths. All internal communication paths and all testable parts of the loop-units are included in the Periodic BIST mechanism, to verify the whole path from detection to reporting (fire) status. The system creates a log with the results of the Periodic BIST. This log can be extracted from the system with a USB memory stick. Short Circuit Isolator (SCI) The built-in SCI isolates short circuits on the loop-line and also has a probe function for evaluating a short circuit. The SCI ensures that the fire detection system does not lose contact with the loop units when there is one short circuit on the loop-line. The probe function makes it possible to reset the short circuit condition without restart of the loop-line. Configuration of Safe I/O and Safe Relay The CS-IC22 has: two configurable input/outputs, called Safe I/O; two relay contact outputs, called Safe Relay If a shielded cable is used on the sub-loop it shall only be terminated at one end. If the shield is terminated in the I/O unit it is connected to the shield terminal, this is only possible if the loop line is shielded. Do not use electrical screwdriver. Maximum torque 2 Nm.

Technical specifications

Ingress protection	IP66	Operating current (alarm condition, LED activated)	3 mA ± 5%
Cable gland	M20 for cable ø 6–13mm	Switch-on extended operating temperature (ST1)	+15 °C during 10 min
Enclosure material	Stainless steel AISI 304	Body width	150 mm
Gasket material	Polyurethane and silicone	Body height	150 mm
Weight	1.685 kg ± 5%	Body depth	80 mm
Operating voltage	22–38 VDC	Overall width	200 mm
Sub-loop current limit	5 mA	Overall height	196 mm
Relay output rating (30 VDC)	30 VDC, max 1 A	Mount width	175 mm
Relay output rating (110 VDC)	110 VDC, max 0.3 A, resistive load	Mount height	106 mm
CE conformity	EN 54-17, EN 54-18	External earth connection thread	M6
Approvals	EN 50155, EN 45545-2	Product illustration — G010977	G010977 product illustration; source page 1; source SHA 8596d424e9eac44c90d9bcb68247e4755c256de9fe3de3501f328023dc541843; source bbox [112.429, 73.24, 309.067, 258.36]. The complete native illustration is retained in the source appendix; this is not a fragment-level numeric interpretation.

Current certificate validity	Not provided	Location of DIP switches and terminals — Figure 1 (G011267)	Figure 1. Location of DIP switches and terminals on the PCB; source page 3; source SHA 8596d424e9eac44c90d9bcb68247e4755c256de9fe3de3501f328023dc541843; source bbox [303.638, 105.908, 510.236, 386.885]. The whole location context is preserved: ADDRESS and FUNCTION labels, S101, S102, J101, J102, J103, SHIELD, and the G011267 source figure. Address switch S101 is an 8-pole loop-address switch. Function switch S102 is a 4-pole factory-set switch, not used for current operation modes; do not change it.
Safety architecture type	Type B	Connection example — Figure 2 (J101/J102/J103)	Figure 2. Terminals J101, J102 and J103; source page 5; source SHA 8596d424e9eac44c90d9bcb68247e4755c256de9fe3de3501f328023dc541843; source bbox [95.039, 105.973, 499.598, 361.699]. Loop IN 1+ / 2- Loop/SCI; Loop OUT 3+ / 4- Loop/SCI; Sub-loop 1 5+ / 6- with 1.5 kΩ and 3.3 kΩ examples; Sub-loop 2 7+ / 8- with 1.5 kΩ and 3.3 kΩ examples; Relay 1 11 C / 12 NC / 14 NO; Relay 2 21 C / 22 NC / 24 NO. External connection shown in normal not active state. Shielded sub-loop cable is terminated at one end only; if the shield is terminated in the I/O unit, the loop line must be shielded.
HFT	0	Connection example — Figure 3 (LHD)	Figure 3. Linear Heat Detection (LHD) cable; source page 5; source SHA 8596d424e9eac44c90d9bcb68247e4755c256de9fe3de3501f328023dc541843; source bbox [95.039, 373.707, 499.598, 627.960]. Loop IN 1+ / 2- Loop/SCI; Loop OUT 3+ / 4- Loop/SCI; Sub-loop 1 5+ / 6- with 1.5 kΩ and 3.3 kΩ examples; Sub-loop 2 7+ / 8- with LHD and 1.5 kΩ + 1.5 kΩ examples; Relay 1 11 C / 12 NC / 14 NO; Relay 2 21 C / 22 NC / 24 NO. External connection shown in normal not active state. Shielded sub-loop cable is terminated at one end only; if the shield is terminated in the I/O unit, the loop line must be shielded.
SFF	92 %	Installation caution	Do not use electrical screwdriver. Maximum torque 2 Nm.
PFDavg	3.24 × 10-4	Address switch configuration (S101)	8-pole S101 loop-address DIP switch; 1–150 valid addresses; binary values 1/2/4/8/16/32/64/128; use a pointed tool of suitable size.
PFDavg calculation basis	MTTR 8 h and proof test interval 1 year	Sub-loop remote current limit	5 mA
Safe I/O and Safe Relay	Two configurable Safe I/O and two Safe Relay contact outputs	Loop communication	IDAxt protocol
Sub-loop shield condition	Terminate a shielded sub-loop cable at one end only; a shield terminated in the I/O unit requires a shielded loop line.	Temperature classes	EN 50155:2017
External earth condition	Connect the enclosure external earth connection to earth; see the Installation & Commissioning manual.	Loop cable requirement	See the Installation & Commissioning manual
Source datasheet	Data sheet no. 5210067-00A_CS-IC22 SS WP_Marine_EN_1.0	Production mark	2531/yyyy; yyyy = year of production
Specification change notice	The specifications described herein are subject to change without notice.	System association	CFD5000
Operating current (normal condition)	0.1 mA ± 5%		

Technical data · Source page 2
Source column 1
Operating voltage 22–38 VDC
Operating current:
- Normal condition 0.1 mA ± 5%
- Alarm condition with 3 mA ± 5% LED activated
Sub-Loop (Remote Current limited: 5 mA indication, supervised dry-contact reading)
Loop communication IDAxt protocol
Relay output 30 VDC, max 1 A 110 VDC, max 0.3 A resestive load
Operating -40 °C to +70 °C temperature
Switch-on extended +15 °C during 10 min operating temperature (ST1)
Temperature classes EN 50155:2017 according to
Storage temperature -50 °C to +70 °C
Relative humidity ≤ 95 % RH non-condensing
Addressing method DIP switch
Ingress protection IP66
Cable gland M20 for cable ø 6–13mm Material: Nickel plated brass
Cable terminals 2.5 mm2
Material Enclosure: Stainless steel AISI 304 Gasket: Polyurethane and Silicone
Weight 1.685 kg ± 5%
Colour Polished surface
Loop cable See the Installation & requirement Commissioning manual
CE Conformity EN 54-17, EN 54-18 Approvals EN 50155, EN 45545-2
Certified according to 2531/yyyy yyyy = year of production

Functional safety data · Source page 3
Source column 1
Type B
HFT 0

Functional safety data · Source page 3
Source column 1
SFF 92 %
PFDavg 3.24 × 10-4
PFDavg is calculated for MTTR 8 h and proof test interval 1 year. Suitable for use in SIL 1 and SIL 2 environments.

Built-in short-circuit data · Source page 3
Source column 1
Ic max (Maximum Continuous 500 mA current)
current) Is max (Maximum Switching 800 mA current)
Current when short circuited < 1 mA (IL max)
Open to Close voltage 22 ± 2 VDC
Open to Close, maximum load ≈1.2 kΩ expressed in ohms on the non- energized side
Close to Open voltage 14 ± 2 VDC

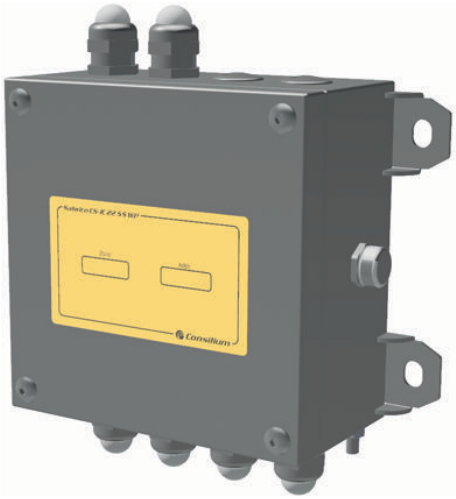
Terminal connections · Source page 3	
Source column 1	**Source column 2**
1 + Loop	
2 - Loop/SCI	
3 + Loop	
4 - Loop/SCI	
5 + Sub-loop 1, High	
6 - Sub-loop 1, Low	
7 + Sub-loop 2, High	
8 - Sub-loop 2, Low	
11 C	

Terminal connections · Source page 3	
Source column 1	**Source column 2**
12 NC	Relay output 1
14 NO	
21 C	
22 NC	Relay output 2
24 NO	

Safe I/O configurations · Source page 4				
I/O type	**Condition**	**Active level**	**Monitored**	**Additional condition**
	General	H/L	X	X
	Alive signal NA X			
Output	Remote Indication (RIL)	NA		

a.Monitored for cable break and short circuit.
b.A Safe I/O configured as an Alarm input can be assigned the alarm sub-types: ‘Smoke’, ‘Heat’, ‘Flame’ and ‘MCP’.
c.Only one alarm input per CS-IC22 is allowed.
d.Only one fault input per CS-IC22 is allowed.

Safe Relay configurations · Source page 4				
Output	**Condition**	**Active level**	**Monitored**	**Additional condition**
	Disable-ment	H		
	General	H/L		X



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Input/Output Loop Unit
CS-IC22 SS WP

Part no. 5210067-00A

System: CFD5000

General description

The CS-IC22 SS WP is an input and output unit for various integration of safety inputs/ outputs. It has been designed for use in harsh and corrosive environments and to comply with the standards for the industrial, maritime, offshore and rolling stock markets up to Safety Integrity Level 2 (SIL 2).

The CS-IC22 SS WP has two inputs that can be connected to external equipment with a dry relay contact. The CS-IC22 WP supervises the cable to the external equipment for cable break and short circuit, and the inputs can be configured as active high or active low. The function of the inputs can be configured to be:

- a general input
- a fault
- an alarm from a manual call point
- an alarm from a smoke sensor
- an alarm from a heat sensor
- an alarm from a flame sensor
- an alive signal (output)

The CS-IC22 SS WP can control and monitor external devices, such as fire doors, fire dampers, sprinklers, hatches etc. The outputs on the CS-IC22 SS WP can be configured to be activated when there is a fire, fault, disablement or input condition locally on the loop-line.

Features:

- Two dry relay contact outputs, used as safety relays for external control
- Two configurable I/O – they can either be ‘remote indication’ outputs, alive signals or dry contact inputs
- Handling of short circuits and cable breaks on the loop-line
- Stainless steel enclosure IP66

Local intelligence via an integrated CPU

The integrated CPU makes it possible to make decisions locally, like evaluation of the alarm condition.

IDAxt protocol

The IDAxt protocol meets the demands on data integrity, reliability and robustness required for use in SIL 1 and SIL 2 safety functions and safety systems.

Periodic BIST

The Periodic Built-In Self-Test is a central mechanism which the system uses to ensure long proof test intervals.

Countermeasures (defences) have been implemented in order to address the fault modes (threats) in the fire detection system. These countermeasures are done in order to increase the confidence in the system.

The system has two types of Built-In Self-Tests (BIST). The first BIST is made continuously; for instance when reading A/D values from hardware. This typically involves evaluation of the read value to determine if the

hardware is broken; i.e. gives measurements outside an acceptable interval.

The second BIST is the Periodic Built-In Self-Test (Periodic BIST) which is made once every five minutes in order to verify the safety function by testing communication paths. All internal communication paths and all testable parts of the loop-units are included in the Periodic BIST mechanism, to verify the whole path from detection to reporting (fire) status.

The system creates a log with the results of the Periodic BIST. This log can be extracted from the system with a USB memory stick.

Short Circuit Isolator (SCI)

The built-in SCI isolates short circuits on the loop-line and also has a probe function for evaluating a short circuit. The SCI ensures that the fire detection system does not lose contact with the loop units when there is one short circuit on the loop-line. The probe function makes it possible to reset the short circuit condition without restart of the loop-line.

Data

Operating voltage	22–38 VDC
Operating current:	
- Normal condition	0.1 mA ± 5%
- Alarm condition with LED activated	3 mA ± 5%
Sub-Loop (Remote indication, supervised dry-contact reading)	Current limited: 5 mA
Loop communication protocol	IDAxt
Relay output	30 VDC, max 1 A 110 VDC, max 0.3 A resestive load
Operating temperature	-40 °C to +70 °C
Switch-on extended operating temperature	+15 °C during 10 min (ST1)
Temperature classes according to	EN 50155:2017
Storage temperature	-50 °C to +70 °C
Relative humidity	≤ 95 % RH non-condensing
Addressing method	DIP switch
Ingress protection	IP66
Cable gland	M20 for cable ø 6–13mm Material: Nickel plated brass
Cable terminals	2.5 mm^2
Material	Enclosure: Stainless steel AISI 304 Gasket: Polyurethane and Silicone
Weight	1.685 kg ± 5%
Colour	Polished surface
Loop cable requirement	See the Installation & Commissioning manual
CE Conformity	EN 54-17, EN 54-18
Approvals	EN 50155, EN 45545-2 CE
Certified according to	⊙ 2531/yyyy yyyy = year of production

Functional Safety Data

Type	B
HFT	0
SFF	92 %
PFD_{avg}	3.24×10^{-4}

PFD_{avg} is calculated for MTTR 8 h and proof test interval 1 year.

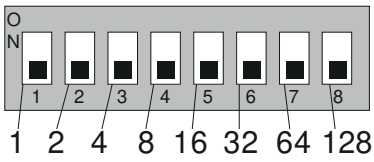
Suitable for use in SIL 1 and SIL 2 environments.

Data for built-in Short Circuit Isolator (SCI)

Ic max (Maximum Continuous current)	500 mA
Is max (Maximum Switching current)	800 mA
Current when short circuited (IL max)	< 1 mA
Open to Close voltage	22 ± 2 VDC
Open to Close, maximum load expressed in ohms on the non-energized side	≈1.2 kΩ
Close to Open voltage	14 ± 2 VDC

Address switch

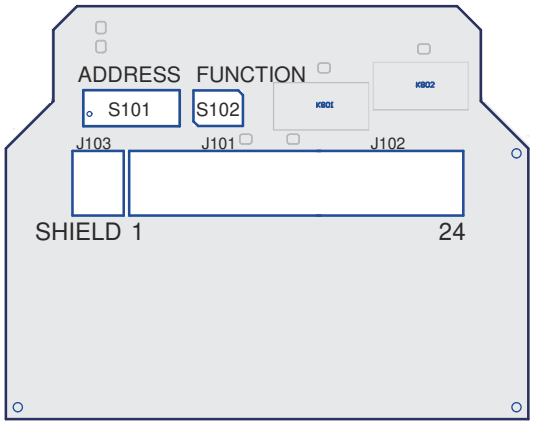
The loop units are identified by a physical address. The address number is set on an 8 pole DIP switch located on the loop unit. (For settings use a pointed tool of suitable size.)



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1 to 150 are valid addresses. The DIP switch value follows the binary system.

Location of DIP switches



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Figure 1. Location of DIP switches and terminals on the PCB

Address switch S101 (8 pole) for the loop address.

Function switch S102 (4 pole) is factory set and will not be used for current operation modes. Do not change !

Terminals

	Cable shield
1 +	Loop
2 -	Loop/SCI
3 +	Loop
4 -	Loop/SCI
5 +	Sub-loop 1, High
6 -	Sub-loop 1, Low
7 +	Sub-loop 2, High
8 -	Sub-loop 2, Low
11 C	
12 NC	Relay output 1
14 NO	
21 C	
22 NC	Relay output 2
24 NO	

Configuration of Safe I/O and Safe Relay

The CS-IC22 has:

- two configurable input/outputs, called Safe I/O
- two relay contact outputs, called Safe Relay

Table 1. The allowed configurations of Safe I/O

Safe I/O		Active High/Low	Monitored[a.]	CS-IC22
Input	Alarm[b.]	H/L	X	X[c.]
	Fault	H/L	X	X[d.]
	General	H/L	X	X
Output	Alive signal	NA		X
	Remote Indication (RIL)	NA		

[a.] Monitored for cable break and short circuit.

[b.] A Safe I/O configured as an Alarm input can be assigned the alarm sub-types: ‘Smoke’, ‘Heat’, ‘Flame’ and ‘MCP’.

[c.] Only one alarm input per CS-IC22 is allowed.

[d.] Only one fault input per CS-IC22 is allowed.

Table 2. The allowed configurations of Safe Relay

Safe Relay		Active High/Low	Monitored	CS-IC22
Output	Fire	H		
	Fault	L		X
	Disable-ment	H		
	General	H/L		X

Connection examples

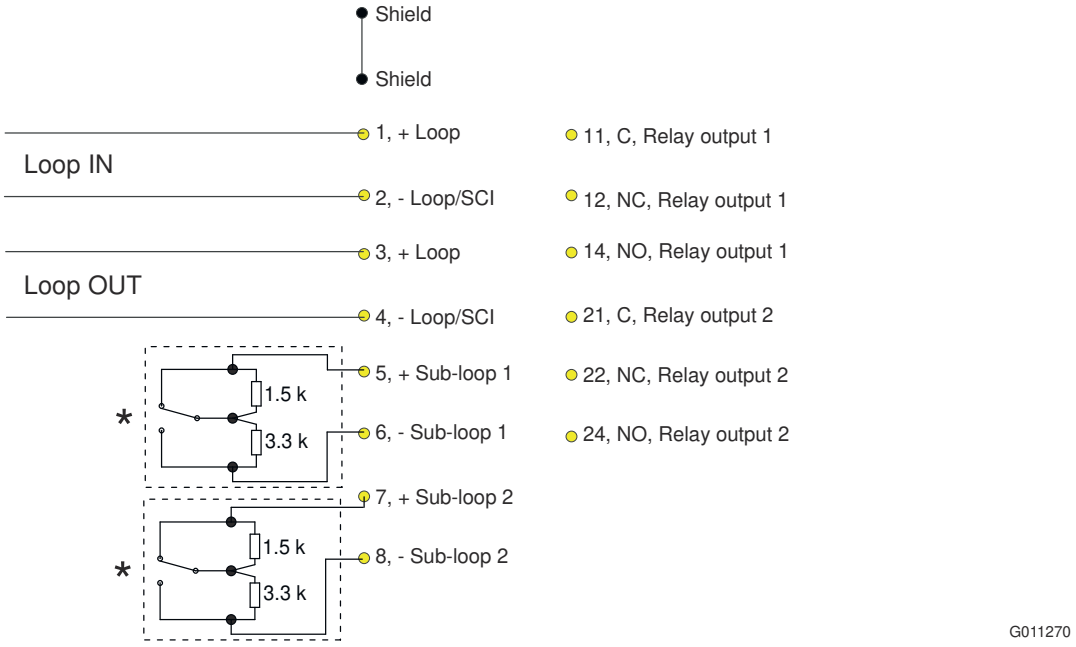


Figure 2. Terminals J101, J102 and J103

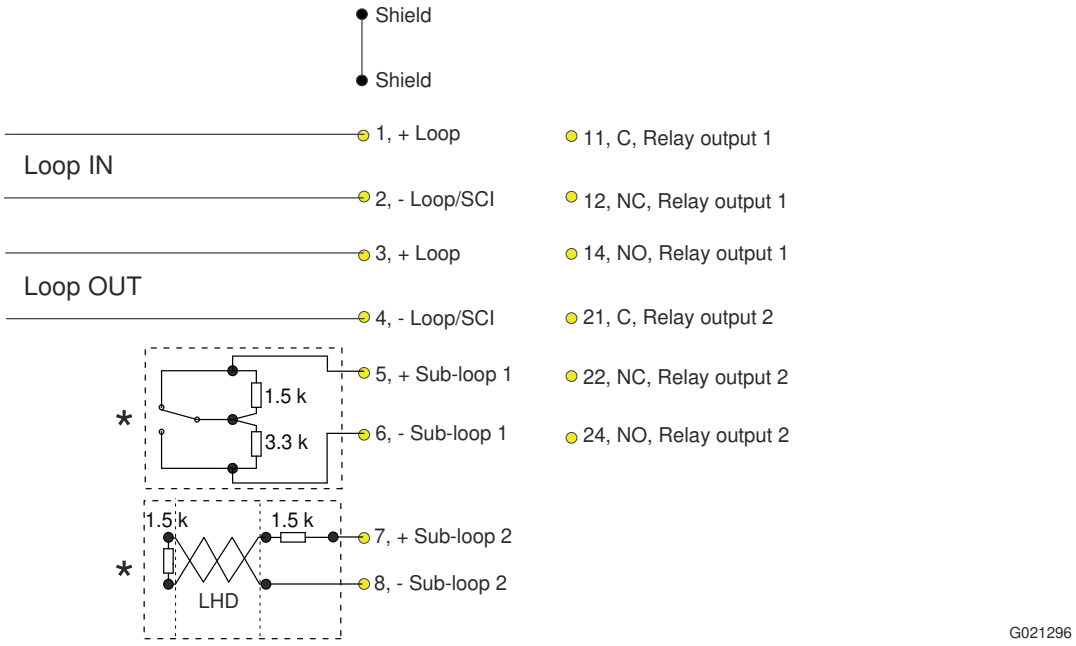


Figure 3. Linear Heat Detection (LHD) cable

* External connection shown in normal not active state

If a shielded cable is used on the sub-loop it shall only be terminated at one end. If the shield is terminated in the I/O unit it is connected to the shield terminal, this is only possible if the loop line is shielded.

External earth connection

The external earth connection on the enclosure shall be connected to earth. For more information see the Installation & Commissioning manual.

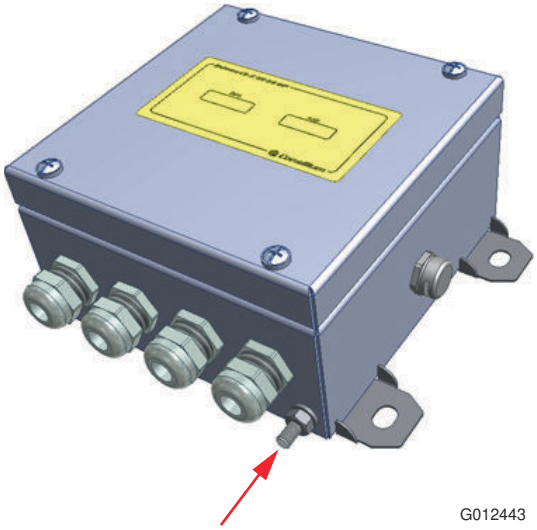
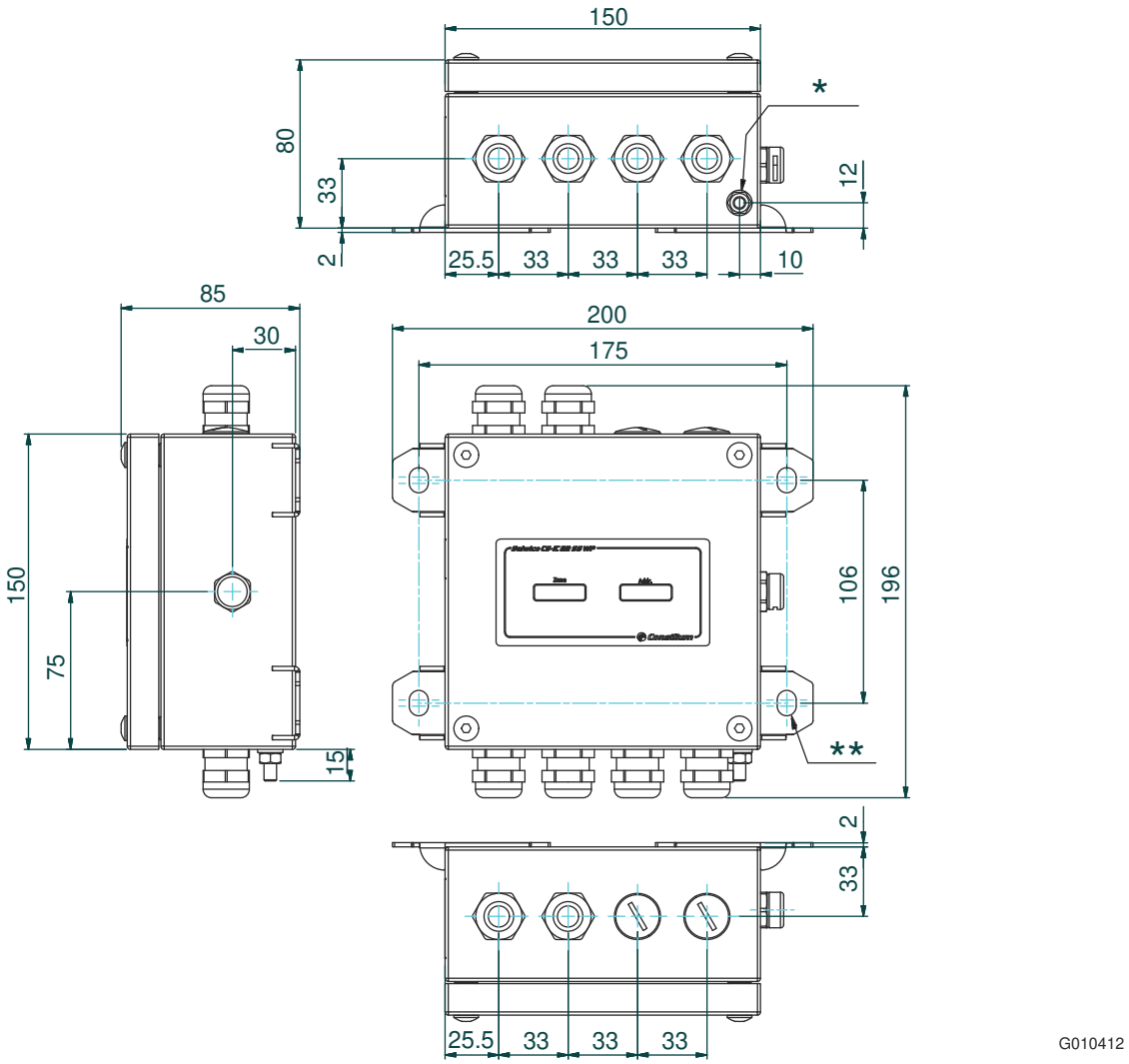


Figure 4. The M6 external earth connection

Dimensions (mm)



*** M6 external earth connection**

** **Holes for wall mounting (x4)**: Max screw thread M8

Do not use electrical screwdriver.
Maximum torque 2 Nm.